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TREMECTOPOUS VIOLACEUS (CEPHALOPODA: TREMECTOPODIDAE)
IN THE
STOMACH CONTENT OF A SWORDFISH FROM THE ADRIATIC SEA **

KEY WORDS: Cephalopoda, *Tremoctopus violaceus*, *Xiphias gladius*, Adriatic Sea, feeding

Summary

Remains of a female blanket octopus, *Tremoctopus violaceus*, — a buccal mass and 19 eggs — were found in the stomach content of a swordfish caught in the Adriatic Sea. This cephalopod has not been recorded here since 1936. The occurrence of *T. violaceus* in the Adriatic is related to the hydrological properties of the sea.

Riassunto

I resti di una femmina di *Tremoctopus violaceus* — un bulbo buccale e 19 uova — sono stati rinvenuti nello stomaco di un pesce spada pescato nell'Adriatico meridionale. L'ultima segnalazione adriatica di questo cefalopodo risale al 1936. La presenza di *T. violaceus* nell'Adriatico viene posta in relazione con le peculiarità idrologiche del mare.

Introduction

The swordfish, *Xiphias gladius* L., 1758 (Osteichthyes: Xiphiidae), is an opportunistic predator which largely preys upon pelagic cephalopods (TOLL & HESS, 1981; BELLO, 1991). The stomach of a swordfish caught in the southern Adriatic Sea contained remains of a blanket octopus, *Tremoctopus violaceus* DELLE CHIAJE, 1830 (Cephalopoda: Tremoctopodidae). This cephalopod was not previously reported as swordfish prey.

T. violaceus is a moderately rare circumtropical pelagic octopod. Its subspecies *Tremoctopus violaceus violaceus* DELLE CHIAJE, 1830 lives in the Atlantic Ocean and the Mediterranean Sea (THOMAS, 1977). It has been reported all over the Mediterranean (MANGOLD & BOLETZKY, 1987). The occurrence of *T. violaceus* in the Adriatic was recorded for the last time in 1936. In that year «blanket octopuses appeared in huge number for a few days in the Northern Adriatic Sea» (LANE, 1974). Previous Adriatic records of the species date back to the last century (GAMULIN-BRIDA & ILIJANIĆ, 1972; BELLO, 1990).

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Materials and methods

The swordfish was captured by drifting longline in the southern Adriatic, in September 1991. Due to the fishing technique — a 30 km long fishing line is paid off and left to drift overnight — the exact place of capture is not known. However, it occurred in waters deeper than 500 m.

The stomach contained cephalopod remains: a few loose beaks, one buccal mass and 19 eggs. The beaks and the radula were extracted from the buccal mass for examination. All beaks were identified following CLARKE (1986) and by comparison with examples from whole cephalopod specimens, including the Mediterranean pelagic octopods, i.e. *Argonauta argo* L., 1758, *Ocythoe tuberculata* RAFINESQUE, 1814, and *Tremoctopus violaceus*. Beak terminology follows CLARKE (1986).

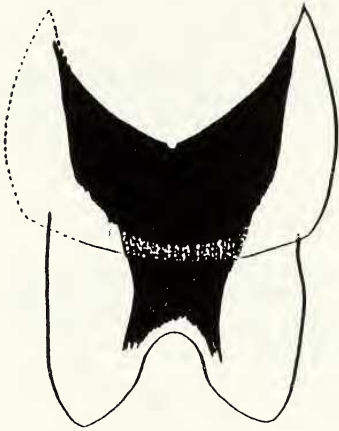


Fig. 1 - Lower beak of *Tremoctopus violaceus*; top view. Scale bar: 5 mm.

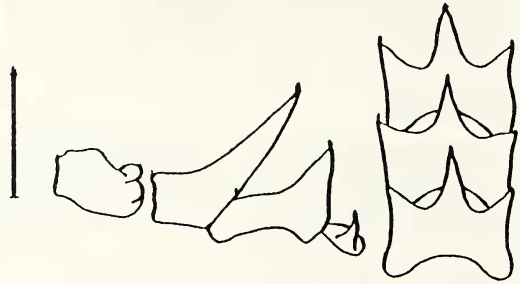


Fig. 2 - Radula of *Tremoctopus violaceus*. Redrawn from Thomas (1977).

Results

The loose beaks belonged to *Todarodes sagittatus* (LAMARCK, 1798) (4 upper and 3 lower beaks) and *Ancistroteuthis lichtensteinii* (FÉRUSSE, 1835) (one pair of beaks).

The buccal mass and the 19 eggs were ascribed to a female of *Tremoctopus violaceus*.

The beaks from the buccal mass have the general aspect of pelagic octopod beaks (*Argonauta*, *Ocythoe*, and *Tremoctopus*). However, some peculiarities are apparent (CLARKE, 1986). The lower beak is rather flat, flatter than in *Argonauta argo* and *Ocythoe tuberculata*. The darkly pigmented part is neatly separated from the transparent part; its pattern, in top view, is quite distinctive (Fig. 1). Both upper and lower beaks have no rostrum. The lower beak measures are: hood length = 4.5 mm, crest length = 7.5 mm. The estimated mantle length is about 9 cm.

The radula is very characteristic and corresponds to the descriptions and illustrations given by JATTA (1896), NAEF (1923), and THOMAS (1977). The rachidian tooth is broad, with two large secondary cusps; the first lateral tooth is unicuspid and almost rudimentary (Fig. 2).

The eggs are oval and argonaut-like. Most of them have a remain of the stalk. Their mean size is about 1.4x0.9 mm. That is in agreement with the sizes given by SACARRÃO (1950), 1.3x0.85 mm, and WIRZ (1958), 0.9x1.5 mm, for preserved eggs. (Argonaut eggs are smaller; according to WIRZ [*loc. cit.*] their size is 0.8x0.6 mm).

Discussion

The present is the first Adriatic record of *Tremoctopus violaceus* since 1936 (LANE, 1974).

The find of this pelagic octopod in the Adriatic in late summer may depend on the hydrological properties of the sea. In fact, blanket octopus occurrence in some areas of the Mediterranean seems to be linked to the warming up of the waters (Wirz, 1958; Biagi & Bertozzi, 1992). The Adriatic is marked by extreme seasonal temperatures, with a North-South gradient which switches direction twice a year (Zore-Armanda, 1984). In the wintertime the surface layer temperature is lowest in the northernmost part of the basin and, overall, the Adriatic surface waters are colder than the adjacent Ionian Sea. This phenomenon would hinder warm water species from entering the Adriatic. In the summertime the northernmost Adriatic is warmest and the surface layer temperature is about the same — above 25°C — in the South Adriatic and the North Ionian Seas. This fact explains the appearance along the Italian Adriatic coast of late Summer-early Autumn warm water species visitors, for instance the bony fishes *Balistes carolinensis* GMELIN, 1789 and *Mola mola* (L., 1758) (personal observations), and possibly *T. violaceus* itself. In this respect, THOMAS (1977) reports that *T. violaceus* «latitudinal limits are influenced by temperature fluctuations. [...] For the Discoverer material the temperatures at the surface were between 25.2°C-25.5°C».

As regards the occurrence of blanket octopuses in the southern Adriatic, there is an indirect evidence for it in a demology work by SCORCIA (1974) about the fishery world of Bari (Apulia, Italy). This author describes the «male argonaut», occasionally caught by net, as slightly smaller than the female, devoid of shell and having stinging arms. However, its reported size is indicative of a misidentification since male argonauts are much smaller than females and are not captured by fisherman nets. Moreover, the stinginess suggests that the supposed male argonauts are in fact small blanket octopuses. Indeed, a high fraction of small individuals (males and young females) of *T. violaceus* carry on their I and II arms fragments of cnidarian tentacles with undischarged nematocyst batteries (THOMAS, 1977). This capability was described in earlier times in Mediterranean blanket octopuses as well (NAEF, 1923).

According to VOSS (1967) and THOMAS (1977), *T. violaceus* is an epipelagic species which most likely does not descend below the thermocline. However, a few specimens were taken at greater depths, down to about 300 m (ROPER & YOUNG, 1975). The heredescribed specimen was probably

preyed upon during nighttime, close to the surface, where swordfish habitually feed in this part of the day (BELLO, 1991).

To the best of the author's knowledge, *T. violaceus* has not been previously reported as swordfish prey (see negative evidence in TOLL & HESS [1981] and BELLO [1991]). THOMAS (1977) reports the occurrence of a specimen of the subspecies *Tremoctopus violaceus gracilis* (EYDOUX & SOULEYET, 1852) in the stomach of *Alepisaurus* (Osteichthyes: Alepisauridae).

The co-occurring prey species *Todarodes sagittatus* and *Ancistroteuthis lichtensteinii* are frequently eaten by eastern Mediterranean swordfish (BELLO, 1991).

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